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CONTENTS

Selection among Cosmic Images: HAYM JAFFE 253

The Self, Given and Implied—A Discussion: EDGAR S. BRIGHTMAN *and* DONALD C. WILLIAMS 263

Abstracts of Papers Read at the Thirty-Fifth Annual Meeting of the Western Division of the American Philosophical Association, Indiana University, March 29 to 31, 1934 269

Book Reviews 275

JOHN DEWEY, *Art as Experience.*

R. P. LOUIS LACHANCE, *Le Concept de Droit selon Aristote et S. Thomas.*

EUGENE FREEMAN, *The Categories of Charles Peirce.*

E. AUGIER, *Mécanismes et Conscience.*

DONALD O. WAGNER, *editor, Social Reformers: Adam Smith to John Dewey.*

J. E. TURNER, *Essentials in the Development of Religion.*

Other New Books and Journals 280

Notes and News 280

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THE JOURNAL OF PHILOSOPHY

SELECTION AMONG COSMIC IMAGES

ELPINO: How is it possible that the universe is infinite?
FILOTEO: How is it possible that the universe is finite?
ELPINO: Do you mean that one can prove this infinity?
FILOTEO: Do you mean that one can prove this finitude?
ELPINO: What an extravagance of fantasy that is!
FILOTEO: How *your* view narrows! [1]

FILOTEO and Elpino might in that way take definite stands on practically all conceptions the scientist uses, as action-at-a-distance, inertia, or absolute rotation. And on every one of these questions our imaginary dialogues, unlike Bruno's, could end inconclusively. Filoteo and Elpino would be equally convincing. Nor would any experiment favor the thesis and reject the antithesis.

Assume space infinite, if you wish. You can not, however, claim as Bruno did that the opposite notion is absurd. The latter conception may meet the elegance of your view with cumbersomeness, still the unwieldy image is logically permissible. But surely there are some kinematic properties, the antagonist may say, that any physical space whatsoever *must* have for an experiment to have meaning. Analysis, however, invariably points to the same answer: Filoteo can construct a mechanical image to interpret the identical experiment which will differ widely from Elpino's. Always there is choice for the scientist.

This refutes the usual view that the scientist records only what he finds in the world about him. That picture portrays the scientist so impersonal that with his observed data he does not build his laws; rather he uncovers the laws of nature. He no more makes the Law of Gravitation than he gives roundness to the earth. Therefore, if he be a physicist, we feel we can almost replace him by one of his many instruments. Everything is so completely determined, all one need do is to connect the dots on the graph paper and we have a curve, expressing a natural law!

The scientist, however, can no more be classed among fact-finding machines than Titian can be classed among cameras. Our purpose, therefore, is to show that the scientist, too, is an artist. It then holds that the law of nature is held within bounds, controlled by our experiments, but not *completely* determined by them.

[1] Giordano Bruno: *De l'infinito universo e mondi.*

For instance, the scientist tries a simple experiment, say, Galileo's experiment with falling bodies. He sets up his apparatus. The weight is dropped, and the readings are recorded. The scientist has tested Galileo's findings, and he seems forced to Galileo's conclusion: $s = \frac{1}{2} gt^2$. Could there be a better instance of a definite unique law? Yet the history of the development of the law that "governs" falling bodies shows that this experiment is far from simple. Even the apparatus is complicated—in fact, so complicated, that we must presuppose with Kant a logic, with its judgments, and a geometry—*a complete universe*—before we can interpret our experiment. We eliminate certain features in the apparatus as irrelevant. And then we say: "Under ideal conditions, the law is. . . ." But has not the scientist been forced to Galileo's conclusion only because he has Galileo's world view?

The principle to guide our search for the *principium individuationis*—the space-time lattice—is Kantian: What kind of space and what kind of time must every scientist presuppose for any experiment whatsoever? The question of the infinity of time is hardly relevant for any experiment a scientist with his finite number of observations can undertake. Nor does our solution so much revolve on empirical findings as on the method of critical philosophy.

Time has been likened to a continuous stream—but unlike the Jordan, no Joshua had ever stopped its flow and then bade it resume. Since we become conscious of the flow of time through the motion of bodies, some have thought of time as a function of motion. This functional-hypothesis of time is very ancient, dating back to the Upanishads, about 600 B.C. In the *Timaeus* Dialogue, Plato suggests a similar thought. And it is also very modern. Some workers in the *quantum theory* suggest that time is a function of some elemental particle, as the electron or proton, and of the velocity of light. The functional-hypothesis of time was refuted by Plotinus and again by St. Augustine. We postulate *for possible experience* that time is continuous and uniform—a view with which the functional-hypothesis ill accords.

The second hypothesis is that of "discrete-time," but with it is allied the doctrine that motion is illusory. If the universe is perpetually being created by God, then we can have no genuine flow of time. If this world is only a series of cinema films, which when run off successively gives the illusion of motion and life, continuity of time is then a fiction. But instead of postulating a time-flow, a much more complex situation is being presupposed.

But the question of the continuity of time has been presented by the founder of modern mechanics, and upon his positive answer is

built the science of to-day. In Galileo's *The Two New Sciences* discussion arises on the meaning of acceleration. Is acceleration proportional to the space traversed or to the time elapsed? The former thesis assumes time discontinuous, the latter that it be continuous. The meaning of Galileo's conclusion for us is that he *chose* time to be continuous. A body therefore can not be in two places simultaneously. Our science, which is built on his results, has confirmed the wisdom of his choice.

We postulate then for our mechanics this third hypothesis of time. Ostwald has formulated its properties: that it be continuous, single-valued, that it contain no double points, and that it indicate direction. We can therefore describe all phenomena *in* time, and consider motion as a function, $f(t)$, where t is the independent variable and is continuous. Then, under arbitrary transformations of this parameter t, an invariance in form of our kinematical equations is required. Yet every observer, whether he measures by the theory of relativity or by the classical theory, assumes Ostwald's postulates. The difference between Einstein's local time and Newton's absolute time is that for the latter an additional assumption must be made, namely, that there be a privileged observer.

Through the centuries the basic geometry of mechanics was assumed to be identical with the pure geometry of Euclid. Gauss had impiously enough hoped that there be a constant measure in the universe, that space be non-Euclidean. Today the scientists consider that space in an intense gravitational field or in the immediate region of an electron with its high velocity to be non-Euclidean. But whatever spatial geometry the physicist uses *is a metric geometry*. And since the metric is the characteristic of a geometry, we now inquire into the kind of metric the scientist elects. That he must choose *some* metric seems obvious.

That the physics of today has discarded the metric of the three-dimensional Euclidean space, $ds^2 = dx_1^2 + dx_2^2 + dx_3^2$ for $ds^2 = dx_1^2 - dx_2^2 - dx_3^2 - dx_4^2$ indicates that our metric is undetermined except by experiment. The g_{ij}'s lie within a range of error. Yet *within the limits of the threshold of observation*[2] *we have a choice* of many world-geometries, ranging from slight modifications of Euclid, to the "spherical" universe of De Sitter, and to the "cylindrical" universe of Einstein. And connected closely with the choice of the metric is the problem, whether the universe is infinite, or finite but boundless, or perhaps finite but expanding. We conclude then that for physical space *a metric must be postu-*

[2] The classification based on the threshold of observation is the one developed by Edgar A. Singer, Jr., in his forthcoming book, *Experience and Reflection*.

lated; but the limits of experimental error leaves room for a wide choice for the scientist.

And now to turn to the region that falls beneath the lower threshold of observation. Beyond the reach of an ultra-microscope are the answers to the problems of image-building. For instance, of utmost interest to physical geometry is the determination whether the universe be a plenum or a void. A microscope is useless in seeking the solution.

From the Parmenidean doctrine that empty space can not be are descended Descartes' vortices and the modern hypothesis of an ether. In spite of Aristotle's contention, the opposing notion of Leucippus and Democritus, that the atoms clash in empty space, has had its many champions—especially since the days of Galileo. The special theory of relativity, for instance, because of its insistence on observational data, reminded the scientist that the modern plenum, the Ether, has never been more than a permissible construction in his image-making, and not a physical phenomenon measureable in his laboratory.

Now, the empty space of Democritus is consistent with Newton's theory of gravitation. And the hypothesis of action-at-a-distance has been defended by such keen men as Kant and Laplace. But in general, scientists have been always chary about accepting the hypothesis of action-at-a-distance. Huygens frankly said that "Newton's principle of attraction appeared to him absurd," and Lord Kelvin called it "the most fantastic of paradoxes." And only the intense dislike Newton had for what he called "hypotheses" prevented him from dwelling at length on his own "conjecture" explaining gravitation without invoking action-at-a-distance. Einstein regards universal gravitation as *equivalent* to a uniformly accelerated field of force. Hence, the theory of relativity assumes that gravitational force travels no faster than light. But unless action-at-a-distance be definitely rejected by experiment, its usefulness in furthering the search for truth will be unimpaired.

We see therefore that in the region beneath the lower threshold of observation, the scientist of to-day *may choose between alternative* hypotheses.

It is the upper threshold of observation that places perturbations of phenomena within the range of natural laws and common experiences, just as the adjoining of infinity to Euclidean geometry erases exceptions to general theorems (as, any two straight lines in a plane, *except* parallel lines, intersect in one point). As an instance, let us consider the Second Law of Thermodynamics. To accept this law means however that we take the definite position that the world is finite in time. But now cosmic rays are discovered

that bombard the earth! Therefore, Millikan concludes, somewhere in interstellar space, beyond the upper threshold of observation, nature is constantly building the heavier atoms from lighter ones; energy flows uphill; and the Second Law of Thermodynamics does not hold. These phenomena, Compton argues, are caused by free electrons whose motions are influenced by the magnet earth, and hence the Second Law of Thermodynamics does hold!

Then this region above the threshold of observation gives us possibilities of choice in theories for our image-making.

Even the question of continuity of path—an idea seemingly so obvious that one can hardly conceive its opposite—was once seriously debated by Galileo. If we wish to disregard the adage "Natura non facit saltus," mathematical expressions of discontinuity can be developed that will satisfy all observations within any limits of error. Of course, the mathematics of continuous paths is much easier than that of discontinuities. And when we *assume* discontinuity, that motion is instantaneous, and that the same physical object can be in two places at the same time, we encounter the difficult problem of identifying the object. And even in the world of the electron the champion of continuity need not despair; his differential equations are adequate to describe the phenomena in this sub-atomic world.

And that there are choices independent of the presence of error can be readily illustrated by considering the concept of "mass." Henri Poincaré, after recounting difficulties of Newton, Thomson, and Lagrange, in defining mass, advances this definition: "Les masses sont des coefficients commodes dans les calculs."—Very clear! But only this sort of definition can withstand such modification in physical concepts as the discovery that an increase in energy also means an increase in mass.

Were we to examine the Principle of Inertia or any other fundamental conception of mechanics, we would find the scientist choosing at almost every step between equally attractive alternative interpretations. Experimental data does not decide for or against Euclidean geometry. The formulation of our metric, or of the "cosmical constant λ" will perhaps be recast a dozen times, but always within its scope will be found choices for the scientist. For the phenomena of nature are no more couched in the language of action-at-a-distance, or in a Democritean void, than they are in the language of action-through-contact-only or in an Aristotelian or Cartesian plenum. The scientist selects from any number of colorful world images that interpret natural phenomena; a dying universe, with its energy running downhill; a universe constantly replenishing its waste; a young gigantic soap-bubble universe, hurling nebulae with astonishing speed through space; an oscillating world; a world with ghost stars! Con-

tinuity or discontinuity of path, inertia, mass—there is no concept in science that does not have a rival. It is always a selection from among possibilities. Experimentation may control our explanations, but it does not eliminate choice for the scientist.

The reason the classical empiricist was so certain that through his inductive method he could find *all* the laws in nature, is that he ignored in his experiments the seemingly unimportant fact—probable error. The physicist, towards the end of the nineteenth century, felt it was only a question of time before the remaining details of the universal laws would be filled in. Today, however, we feel confronted, as never before, by most serious problems in every aspect of physics. For instance, in the realm of the electron, we owe our knowledge—and even our perplexity—of quanta behavior to the physicist's method of narrowing the range of observational error as much as he can. The new surprising pictures within the Quantum Theory have won against the older and more familiar atomic models—because ever-present *experimental error* has definitely eliminated the latter.

In the past the scientist has not always realized the full import of the assumption that attached to his data is an error of observation. Nevertheless his freedom in building a cosmic image is inextricably bound up with the notion of mean reading and mean variation. Must there then be errors which no scientist can charm away?

Although an instrument's purpose is to ensure certainty just where our senses waver, the instrument's very refinement removes the doubt to a few decimal places further in an unending decimal series. However painstaking he is in constructing his instrument—a balance, say—the scientist recognizes the crudity of all human workmanship, and hence *assumes* accidental errors. Now these accidental errors affect his procedure. One reading is worthless—worthless because with it comes no possibility of calculating a probable error. Nor are two readings much better. For when these conflict, which can we say is more worthy of credence? Three readings, however, give us the opportunity to establish a mean and mean variations.

As the scientist makes a series of measurements upon the same quantity, he notes that although the series of measurements with its different readings narrow the location of the true value within limits, he can never learn the *true* value, and must always use an approximation. He acknowledges that probable error is attached to any series of observations; no observation will give us the *true* value; and the mean reading can never be more than an approximation of the true value.

In our attempts at eliminating systematic error we are equally unsuccessful. If the experiment be in the realm of electrons and quanta, we definitely affirm the uncertainty-principle. What is that but an acknowledgment that the experimenter's manipulations influence the observation? If our experiment be to measure the exact length of a meter-stick, it does matter how we hold it. What is the Fitzgerald Contraction but a confession of systematic error?

A complicated mechanism ". . . with centric and eccentric scribbled o'er, cycle and epicycle, orb in orb" explained for 1800 years planetary motions. Then the variable error in the observations of the motion of the planet Mars was reduced by Tycho Brahe so much, that a *systematic error* of eight minutes of arc appeared. "Out of these eight minutes," Kepler announced, "we will construct a new theory that will explain the motions of all the planets." But we can never isolate completely our experiment to the realm within our laboratory walls. Whether we blame the perturbations of the distant stars, as Newton did, or we seek other causes, the conclusion seems obvious: systematic errors, as well as observational errors, will always prevent us from obtaining the true value in any finite series of observations.

Hence, any attempted determination of the true value of an x will only give us a range of values reaching from $x_0 - e$ to $x_0 + e$, where x_0 is the mean reading. We can reduce the value of e to less than any given value, but we can never reduce it to zero. Therefore, we can never know the true value of any x, but only an approximation within limits of error.

Nor will the graphing of any single valued function $y = f(x)$ give us a curve, but a band having for its width the finite interval $2e$. In the case of a freely falling body, the space traversed depends on the time of falling, or $s = F(t)$, where F may be some complicated function of t, its values controlled by experiment. We have no unique empirical formula. The value of s may be $F_1(t \pm e)$ or $F_2(t \pm e)$ or $F_3(t \pm e)$. Now in the band whose width has the *finite* extent of $2e$, an infinity of curves may be drawn, and any of these will empirically satisfy the observation $s = F(t)$ within the limits of error. If therefore we choose—no matter what the motive has been for our choice—$s = F_1(t)$ and if this formula is within the limit of error of the experiment, we can call this *a Law of Nature.* Some other scientist, who perhaps has another purpose in mind, prefers $s = F_2(t)$, a much more complicated function of t. Yet this checks up equally well in the laboratory. We reach the strange conclusion that the Law of Nature we write depends within limits on our choice.

"My theory of vortices is a philosophical romance," Descartes confessed. And every theory in science is equally a philosophical romance. Only, the scientist, since the days of Galileo, demands of his imagination that all explanations be in terms of a mechanism. Such a limitation is like the self-imposed restrictions of Dante or Milton, to use a metrical pattern.

Now Lord Bacon's method for successful science—the accumulation of facts, their arrangement, and the discovery of *the unique Law of Nature* (the explanation of the facts), has been embarrassing through its very success. Instead of one theory explaining, say, the attraction of the stone to the earth, we may choose between a Newtonian theory of gravity, the impact-theory of Le Sage, the explanation offered by the theory of relativity, and—who can warrant that some physicist of the future will not propound a yet more ingenious hypothesis?

The old answer in deciding between two theories was to see which fitted the facts. That method is hardly applicable here. Descartes' physics can be resuscitated by a modern physicist, if he wishes to expend the necessary labor, and the modern can make it fit the facts. Then any choice between Descartes' vortices and Newton's action-at-a-distance to explain the motions of planets must be made on other considerations than those of fact.

The scientist prefers, say, Copernicus to Ptolemy, not that the first is true and the latter false, but that the Copernican theory is much the simpler. Then *"economy of means"* is the ideal which impels the scientist to frame his theory as elegantly as he can. How can the scientist build his system to obtain this maximum economy?

Kirchhoff's ideal, simplicity in description, is naïvely vague, and therefore not easy to follow. Should we then prize ease in writing down the mathematical expression of natural laws, or perhaps strive for an invariance of law for all observers? These and many other motives have stimulated the imagination of the scientist. Galileo, for instance, aimed at a simplicity of what sort? His ideal was to make of mechanics a system that would be the analogue of Euclid's Elements. And as Euclid builds his geometry on definitions and axioms," "self-evident truths," so Galileo conceives his mechanics.

These ultimates have for other scientists been geometrical solids and even musical intervals. For Kepler a Pythagorean world picture was the goal. This longing for simplicity in mathematical expression enlisted champions for Copernican astronomy who even braved the displeasure of the Church. For instance, Kepler's Laws form a much more elegant theory than the then traditional description of the motions, now fast, now slow, across the sky.

But the scientist's preference for simple mathematical relation-

ships gave place to the complicated mathematics of Huygens and Newton. Newton's success in replacing two laws with one, the law for the motion of the planets, and Galileo's law for falling bodies, by one law pervading the universe, expressed the new goal: make your principle so comprehensive, that the laws already known form but special cases of it. Laplace, in perfecting Newton's scheme, little regarded whether the necessary mathematics had become difficult. But gravitation is a force that acts in only one direction: two bodies attract each other. A more general law would comprehend both attraction and repulsion; otherwise we must acknowledge the two forces of the Greeks, a love and a hate, in the universe. Boscovich would therefore combine repulsion and attraction into one law of nature and thus reach this goal—universality.

Mach then suggested for the universal goal a new simplicity: *economy of thought.* But this invites the criticism: "economy of thought" is a vague expression. What procedure must be used to reach such an economy? "Economy of thought" is as indefinite as Poincaré's "expediency" or as Kirchhoff's definition of a natural law, as the simplest possible description of natural motions, for the retort, what kind of simplicity, is inevitable. The world applauded Newton for supplanting Galileo's mathematically simple expression by a more complex one. What then can simplicity in description mean, anyway!

Now, every economy must be one either in the number of basic elements, or in the method of operations, i.e., in the logical relations between the basic elements. The ideal for science would be a combination of both economies.

The procedure of the scientist in his laboratory should show us what economy there can be in method. Whatever the experiment be, we see how definitely he describes his procedure. For the successful repetition of the experiment is the test another scientist has of the truth of the results. He must therefore affirm that any hypothesis, or law of nature, one scientist deduces as a result of his experimenting, should be equally true for all observers.

Not only must a law of nature be invariant for all observers, but the very formulation of the law should be free from personal preferences for particular co-ordinate systems. Whether the scientist used Cartesian or polar co-ordinates in his figuring should never enter into the form of a law of nature. Tensor mathematics, a language of the most universal kind, permits us to change from one set of co-ordinates to any other set, while keeping certain functions of the co-ordinates invariant. For precisely this reason Einstein, with unerring instinct, chose it for the theory of relativity.

Let us now turn to the study of the other possible economy:

frugality in the number of basic elements in a mechanical image. Each of the necessary fundamental conceptions we call a "dimension." If L, for example, denotes length, and T time, velocity can be represented by L/T or LT^{-1}. The dimensions of force are equal to mass times the dimensions of acceleration. Since the dimensions of acceleration are LT^{-2}, and if M represents a mass then force is MLT^{-2}. We must not, however, consider any particular dimension as ultimate. For instance, in place of one of the dimensions, M, L, or T, the concept "energy" may be used.

But even if the concepts in physics are not ultimate, we usually think of a geometrical configuration as having a definite number of dimensions. A line is one-dimensional, a plane two-dimensional, and Euclidean space is three-dimensional. Yet the same geometrical configuration can be regarded as having a different number of dimensions, depending on what geometrical elements we consider basic. The number of dimensions only tells us how many co-ordinates the given configuration needs for it to be individuated. And therefore in our mechanical image the number of dimensions is determined by what we choose to be our basic elements.

The ideal world picture is one in which the number of dimensions is reduced to a minimum. And the scientist chooses his fundamental elements with an eye to economy in the number of dimensions needed. Thus he to-day prefers a complicated four-dimensional time-space Riemannian geometry to the corresponding ten-dimensional Euclidean space.

Economy of means is the motive that prompts him to construct the physical atom with as few properties (α, β, γ, . . .) as possible. And only because of the desire for economy in the number of dimensions does the scientist select continuity of path and uses analytic functions, thereby assuring himself of some conservation principle.

The task of the scientist is endless, for no finite labor will reduce observational error to zero. He eliminates, however, from time to time various mathematical curves and their corresponding "laws of nature." He constantly changes his cosmic picture to meet more rigid conditions. But the conceptions of time and space are pregnant with rich possibilities for the nature of the physical atom. An artist's instinct leads the natural philosopher to an economy in his formulation of logical relations and dimensions of the geometry and the space-time of his experiment.

In this way, he is an artist, and it is a creator's vision that impels him to *build* a world picture and *choose* laws to explain the universe.

HAYM JAFFE.

PHILADELPHIA.

THE SELF, GIVEN AND IMPLIED—A DISCUSSION

A RECENT article by Professor Donald C. Williams[1] evinces a disposition, not too common in contemporary philosophy, to deal with fundamentals. "The Innocence of the Given" treats of the fundamental epistemological situation, which is just as truly the fundamental metaphysical situation. The article is especially welcome to me because I find in it so much with which I am in unreserved agreement; and philosophical agreement is greatly to be desired by everyone who does not prefer contradiction to consistency. But along with my agreement goes a certain amount of perplexity. I should like to state the agreement together with the perplexity, and to ask Professor Williams a question or two.

At the outset where Professor Williams states his fundamental theses about the given, there is hardly anything to which I object. It is true that the words in the third sentence, "*given* to human minds —. . . ingredients of the conscious experience of those minds," raise a question as to what these minds are in addition to or apart from what is given to them; do minds consist of their ingredients or is there an unmentioned or ungiven somewhat that is the real mind? This question, however, may be waived for the moment. The important fact is that there actually is something given which is a complex of ingredients of conscious experience. The presence of such a given can be denied successfully by no conscious being. That the given is not knowledge about itself is the main thesis of Professor Williams, and with it I agree, unless there is some hidden meaning in the word "knowledge" not discoverable in the exposition. In this sense, then, the given is truly "innocent." The given, as given, is never known, although Professor Williams hastens to make precisely the explanation at this point that I hoped he would make, when he points out that the given does not have to be "a blind problem," but may be "highly structured and articulate, . . . the whole fabric of an interpretation and the solution of a problem."[2] This point is repeated in the statement that "if x is complex in the manner of the knowledge-pattern, its givenness will constitute a knowledge." All objection is disarmed when the further explanation is made that, under certain conditions, "givenness will constitute not only a knowledge, but at the same time a datum which a knowledge is about."[3] These statements, including their entire context in section 3, constitute a sound analysis of the knowledge situation. They

[1] Donald C. Williams, "The Innocence of the Given," this JOURNAL, Volume XXX (1933), pp. 617–628. Reference to this article will be by page number.

[2] Top of p. 618.

[3] Top of p. 619.

assume, obviously, that the given may be known; but the knowing is not the known—Lloyd Morgan's experienc*ing* is not the experienc*ed*.

Given experience, then, is just what it is, namely, acquaintance, even though it be acquaintance with a knowing process. The meaning of the word "to know" can never be wholly present in the given. Although all knowing occurs in the given, it is always in some sense a reference to or a description of something which is not now given. This is what I take Professor Williams to mean, and what I hold to be true. Under some circumstances, knowledge may refer to "nothing but the given qualities and relations of the given,"[4] but even then, the given known is other than the given given.

Thus far Professor Williams' article is clear and, in my opinion, correct. The attack on the proposition that "all opinions about the ungiven are 'meaningless' "[5] is likewise well grounded. It is certainly true that what is not now given in my experience may be known, and also that what has never been and never will be given in my experience may be known. I should also agree with Professor Williams that there is no epistemological or *a priori* reason for supposing that there is nothing in the universe whose essence it is to be ungiven. But this point might have been explained more fully. Nothing but empirical investigation and coherent philosophical analysis and synopsis can determine whether there is anything absolutely ungiven. There is no magic way of showing in a sentence or two whether the idealism which holds that there is nothing essentially ungiven in the universe or the realism which holds that most of the universe is now and always will be ungiven, is a better account of reality. They are competing hypotheses not to be disposed of by an epistemological gesture. In view of this explanation, I am able, as a personalistic idealist, to agree with the rejection of the four propositions to the criticism of which Professor Williams devotes the next two or three pages of his article. These propositions are: "(1) If a thing is known, it must be given. (2) If a thing is not given, it can not be known. (3) If a thing is given, it must be known. (4) If a thing is not known, it can not be given."[6] These propositions are just as false for a personalist, or at least for this personalist, as they are for Professor Williams. It may be clarifying to formulate the personalistic "truths," i.e., propositions held by a personalist to be truth, which the four "errors" deny. They would be: (1) If a thing is known by a self, it does not need to be a present ingredient of that self. (2) If a thing is not a present ingredient of a self, it may nevertheless be known. (3) If a thing is a present

[4] Second paragraph of 4, second half of p. 619.

[5] Top of p. 620.

[6] P. 620, just below the middle of the page.

ingredient of a self, it may be felt or willed without being known, provided the word "known" is not a loose equivalent for "being an ingredient of present awareness." Not all awareness is knowledge. (4) Even though a thing is not known, in the sense of being described or understood, it may, notwithstanding its being unknown, be a present ingredient of conscious experience; there may be acquaintance without knowledge by description. I should be grateful to Professor Williams or to anyone who would object to these "personalistic" theses, if he were to explain his reasons for objecting.

Thus far in the article there is practically complete accord among all epistemological dualists, at least some epistemological monists, most personalists, all Hegelians, and Professor Williams. I was about to celebrate the millennium when the realistic lion lies down with the idealistic lamb, when it suddenly began to appear that the lamb would be *aufgehoben* inside the lion unless steps were taken. For suddenly, and to my surprise and embarrassment, I found myself quoted [7] among the enemies of my own convictions. I am rightly said to have written the words, "The experienced fact that every item of experience belongs to a self." This I have taken to mean that everything given is in the context of more that is given. In fact I say explicitly on the page following the one quoted by Professor Williams that "the self is the datum," and I explain briefly the confusion between self-consciousness and self-experience.[8] By the datum, or self-experience, I mean exactly what I take Professor Williams to mean by the given, the ingredients of the conscious experience of mind, with the proviso that the ingredients do not occur separately like grains of pepper, but are given in a *gestalt* which is a true whole. Despite this agreement with Professor Williams, I am classified with those who are asserted to hold that the self shares "special honors with Deity as an object of intuitive revelation." [9] If Professor Williams had taken the trouble to read my treatment of intuition, or my article on "The Dialectic of Religious Experience," or my paper on "The Dialectical Unity of Consciousness and the Metaphysics of Religion," [10] or anything else that I have written

[7] Middle of p. 622, and note 8.

[8] *Proceedings of the Sixth International Congress of Philosophy*, p. 163.

[9] Middle of p. 622.

[10] These references are to be found respectively in the following sources. *An Introduction to Philosophy*, pp. 46–49; *The Philosophical Review*, Volume XXXVIII (1929), pp. 557–573; *Proceedings of the Seventh International Congress of Philosophy*, pp. 70–77. See also the explanation of the bearing of "knowledge" by acquaintance on epistemological dualism (which I defended before Lovejoy's *Revolt*), in *An Introduction to Philosophy*, pp. 80–89, in which I already point out, what I now hold much more clearly than then, that "our own self-experience is not, so long as it remains mere experience, genuine knowledge" (p. 88). My view of the self is most fully stated in *A Philosophy of Ideals*, Chapter I, and *Contemporary Idealism in America*, Chapter VIII.

about theory of knowledge, he would know that I have always rejected the proposition that Deity is an object of intuitive revelation, and have never confused the given in self-experience with the knowledge of reflective self-consciousness. His misunderstanding becomes more egregious when one reads his introductory remarks about mystics and intuitionists as maintaining unreservedly that "sheer givenness is a kind of knowledge so complete and certain that the discursive intelligence is in comparison a hopeless falsifier."[11] I repudiate classification under this rubric.

When one's ideas are so completely misunderstood as mine are by Professor Williams, one ought to be reasonably certain that there is some basis for the misunderstanding. I can see at least one reason for the interpretation which Professor Williams put upon my statement. In the context of his argument, my words, "the experienced fact that every item of experience belongs to a self," might be taken to mean that I asserted an intuitive knowledge about all possible items of experience. Yet in the context of my paper, which is here quoted, I tried to guard against such a view by dwelling on the empirical nature of personalism. For the sake of explicit clearness, however, my statement should be revised to read: "the experienced fact, whenever there is given experience, that every item of that experience belongs to the self which is the whole given context." This revision represents no change from what was first meant, and is intended, like Professor Williams' article, to convey knowledge about the given. I still agree with Professor Williams in his main contention, despite his belief that I do not; I reject the proposition that acquaintance with my given self is knowledge of that self, for knowledge is description and is mediation, dualistic in structure.

The latter portion of the article (from p. 625 on) deals with other matters, the relation of which to the foregoing is at some points both remote and dubious. I shall therefore refrain at present from discussing those pages, save for one or two references which are relevant to the main purpose of the present discussion. But I should like to ask one or two questions of Professor Williams which arise from my perplexity about his interpretation of my ideas.

The first question is: Why does Professor Williams not say explicitly that the given is a self or a mind? Obviously it is not a *whole* self, a *whole* mind; but is it not at least a partial self? He says that given "things" (a term which I suspect of being a "weasel-word"; a realistic question-begging epithet) are "*given* to human minds," and are "ingredients of the conscious experience of those minds." Is not the given, then, what the mind is at the moment? He calls the mind "an organization of conscious expe-

[11] Page 621, beginning of section 3.

rience" and describes certain of its processes.[12] He adds, as we have already seen, that the given "is very often highly structured and articulate; it may be as amenable or spontaneous as you please; and it may itself be the whole fabric of an interpretation and the solution of a problem."[13] Then why not a complex, yet unified, active, thinking self? No expression that is used of the given refers to anything other than a self-experience. "Goggling attention" and "blank raw feel"[14] are both descriptions of a self in some of its phases. The illustrative reference to the difference between a star and knowing a star surely does not imply that a star could be "given," although a casual reader might suppose that it did.[15]

The second question is: Is there any objection to treating as synonymous the following expressions: the given, present consciousness, specious present, time-span (Royce's term emphasizing, of course, the temporal structure of the present self), present self-experience, field of attention, datum self? If so, why?

The third question is: Does hesitancy in speaking of the given as a self arise from the fear that the word "self" may somehow pollute the innocence of the given? It is true that to call the given a self means that the innocent self has eaten the fruit of the tree of knowledge. But can a given be a given—such a given as interprets and solves problems—without generating knowledge? Or perhaps the real ground for hesitancy lies deeper. Perhaps it is well not to call the given a self in order to avoid "the fallacy of initial predication" made famous by the new realists. Perhaps this principle of safety first commands us to bear in mind from the start "the possibility of plural rôles for the consciously given."[16] But if such caution forbids acknowledgment that the datum is a self, how can Professor Williams call it a mind and ascribe to it all the properties mentioned in his article? If he replies, in Professor Lovejoy's words, that "a thing can possess more than one character or relation,"[17] I should reply that being a self is at least one indefeasible character of the given. I should also add that the given is not given as a "thing" or a complex of things; to suppose that it is so given is to fall prey to initial predication in its worst form. Santayana and Kant are right in supposing that existence (barring only the temporal "existence" of the given experience) is not given. The supposition that an idea may be both an idea and a thing (or other objective entity or complex) at one and the same time, which

[12] The quotations are from p. 617.
[13] P. 618.
[14] P. 619 and p. 626, n. 19.
[15] Pp. 621–622.
[16] P. 627, n. 21.
[17] *Loc. cit.*

is the fundamental error of realistic epistemological monism, rests on an exaggeration of the difficulties in epistemological dualism, and on a strained analogy. The realists have been telling us that since a point x may be located both in line $a-b$ and in line $c-d$, namely, at their intersection, therefore (therefores always need watching!) any given idea may be both in the conscious series and in the thing series. There is, of course, no cogency at all in the inference. The analogy, at most, teaches us to avoid idealistic dogmatism. It does not prove, or even render plausible, a realistic theory of knowledge. But this issue is incidental both for Professor Williams and for me in the present context. The main point is that the self is given and is given as conscious experience; and that everything beyond this given self can be known only in the spirit of Peirce's "contrite fallibilism."[18] Yet I should like to know whether my speculation about the reason for impersonal terminology in a personal situation is sound.

EDGAR S. BRIGHTMAN.

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My reference to Mr. Brightman quoted from the following sentence: "Personalism is radically empirical in building (as against sensationalism and behaviorism) on the experienced fact that every item of experience belongs to a self."[19] *Prima facie*, there seem, even after Mr. Brightman's recension, to be three fairly plausible ways of interpreting it, none of them entirely satisfactory. (1) "Personalism finds given in immediate experience, as fundamental datum, that experience is a part or a product of the sort of thing customarily called a self or person." I was wrong in assuming this interpretation, and I am sorry for the injustice done Mr. Brightman, whose general views, with respect to such possibility, are very sound. Let us note, however, that my interpretation still does represent a belief, often held and often regarded as thoroughly "empirical," which violates our principle that givenness is not knowledge. (2) "Personalism adopts as a fundamental hypothesis that immediate experience is a part or a product of what is customarily called a self or person." Such hypothesis, I admit, is a legitimate candidate for verification. It seems to me, however, rather the apex than the foundation of a philosophy, and not properly described as "an experienced fact" nor its acceptance as "radically empirical." (3)

[18] P. 628.

[19] *The Proceedings of the Sixth International Congress of Philosophy*, p. 162. The sentence continues, after a comma: "as was forcefully stated in the paper by Miss M. W. Calkins on 'An Essential Factor in Every Truly Radical Empiricism' which was read before the Eastern Division of the American Philosophical Association at its 1923 meeting."

"Personalism begins by *defining* the 'self' or 'person' as the total content of immediate experience." In reply to Mr. Brightman's question, I confess at present to no decided prejudice against this definition. I do ordinarily mean the word "mind" in that sense, so that my "given to the mind" strictly is redundant. But it is not the usual definition, according to which the self is a special sort of agent, substantive, "real whole," or "unified, active, thinking" being, and it is an especially poor definition for Mr. Brightman, since it is quite compatible with sensationalism or even a sane behaviorism, and it empties the name "personalism" of nearly all which has recommended it to its adherents. Mr. Brightman, I think, believes that the self is *both* the total of experience *and* an "active, thinking" "real whole." Such belief, however, is not a definition. It asserts a real connection of characters, and is in fact identical with the problematic material hypothesis considered above (2).

It is a gratifying gain in mutual understanding that the lion and the lamb should start off together, even if they do not eventually lie down together. For my part, I grant the propriety of Mr. Brightman's personalistic version of the contradictories of the four "errors" which I contested. I regret any inadvertent realistic taint about the word "thing," which I intended quite universally, for *any* thing from angels to atoms. I grant that our principle invalidates all off-hand immediate attempts to prove, "by epistemological gesture," that the given does not consist of the visible facets of a spiritual reality, and I grant that the denial of "exclusive particularity" is no positive evidence *for* direct realism. Mr. Brightman, on his part, might justly concede that the denial of "exclusive particularity" disposes of one formidable *a priori* prejudice against direct realism, and that our principle that givenness is not knowledge invalidates any off-hand immediate attempt to prove that the given does not consist of the visible facets of physical objects external to a perceiving organism—yes, even of *stars*.

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ABSTRACTS OF PAPERS READ AT THE THIRTY-FIFTH ANNUAL MEETING OF THE WESTERN DIVISION OF THE AMERICAN PHILOSOPHICAL ASSOCIATION, INDIANA UNIVERSITY, MARCH 29 TO 31, 1934

Physics, Metaphysics, and Theology. HERBERT MARTIN.

Eddington (*The Nature of the Physical World*) offers at least four approaches to an idealistic interpretation of reality: (1) Con-

sciousness testifies to "a higher reality" that the metrical, symbolic world of physics. This reality is continuous with and of the nature of consciousness, indeed a "universal Mind or Logos." (2) Entropy and Becoming witness that time is uni-directional, has an arrow, that the increase of the random element in the universe indicates a beginning with a maximum of organization. Here are inklings of a creator and a "creation at a time not infinitely remote." (3) Mysticism reveals a world of purposes and significances untrammelled by metrical specification. Mystical experience shows "that our minds are not apart from the world." Our unceasing quest for values suggests their inherence in the structure of reality, an "Absolute Valuer" whose they are and whence they come. (4) With determinism "dropped out permanently," with "no strict causal behavior anywhere" our "intuition of Free Will" finds validation, the Supernatural becomes more easy of access.

A series of criticisms of these modes of escape from the closed circle of pointer readings of physics concludes that Eddington's conclusions not only do not follow from his premises, but even if they did, his Supernatural, or Creator, or Absolute Mind is far other than the God of the religious consciousness. In view of this it is regrettable that his prestige as physicist is carried over in the popular mind to his views as metaphysician and theologian.

Method in Philosophy. CARROLL D. W. HILDEBRAND.

Since method so largely determines the substance of philosophy and it is the task of philosophy to follow every pathway which leads to truth, method is a significant problem for philosophy. The method of abstraction seeks reality through a search for universals, objective but independent of particulars. Reality consists in an abstract universal which lies beyond experience and thus becomes a negative category.

The method of concretion interprets reality in terms of human experience critically evaluated. The unity thus achieved is a concrete universal in the sense that particulars and universals or content and form are united. We find in personality an instance of a particularizing universal and a universalizing particular.

This personalistic hypothesis would appear to justify certain important deductions. For example, it reconciles some of the deepest antinomies of reason, determinism and indeterminism, unity and plurality, change and identity, and teleology and mechanism. Moreover, the discovery that the real is personal affords a significant theory for an adequate social philosophy. It would, therefore, seem that the method of concretion together with the conclusion to which it leads, namely, a concrete universal which is personal, must chal-

lenge thoughtful consideration when claims to truth are under investigation.

Beauty, Definability, and Analysis. LIONEL RUBY.

The position asserted is that the concept of beauty is unanalyzable and therefore indefinable. Analysis is taken to be the essential nature of "real" as distinguished from "nominal" definition, and concepts which refer to simple qualities are not susceptible of analysis. The tertiary quality of beauty resembles color in so far as it is also a simple; hence it is an indefinable, just as color is. The physical conditions underlying color may be described, and the object which is beautiful may be described also, but color as color, beauty as beauty, are irreducible simples.

Beauty is apprehended as a pervasive character among certain of the objects in experience, but it is impossible to define the character which we thus apprehend. Beauty can be denoted, but at the terminus of the process of denotation we find a simple quale. The concept of beauty lacks any kind of significant connotation, and we can not explain the nature of beauty by a manipulation of concepts. The difficulty is similar to that of explaining the nature of color to a blind man—we learn what beauty is by being introduced to it. Every supposed definition runs into the destructive criticism that an object may possess the described characteristics and yet lack beauty.

Knowledge by Fiat. ELEANOR BISBEE.

The mind, according to C. I. Lewis, creates at will its own *a priori.* This proves to be a pseudo-*a priori.* Recurrence of "givens" in experience, although ineffable, set the mind in a certain direction. The mind, consequently, coins a category and draws implications from it. By this account, when the implications are valid, the reasoning is true, and when what is implied turns out to be what also happens in experience, it is also useful and we, therefore, "know." This revives the old problem of the inductive leap—when should we proceed from experienced recurrence of "givens" to a predictive generalization? To this Mr. Lewis adds the problem, when can the will pronounce an empirical generalization to be a permanent intension—all exceptions thereafter excluded, by fiat? This will, he says, is subject to pragmatic control in a most empirical relationship between knower and environment. That the mind, with this fiat power, has avoided dangerous inflation of knowledge by purely verbal, hence worthless, categories is due to what Mr. Lewis calls the "miracle" of "similarity of human animals and of their primal interests, and the similarities of the experience with which

they have to deal."[1] This epistemology merely substitutes for the traditional problem of uniform categories fixed by original human endowment, the new metaphysical problem of preëstablished ontological similarities, and leaves the old problems of the *a posteriori* quite unanswered.

Emile Meyerson and the Epistemological Paradox. THOMAS R. KELLY.

Three factors produce an impasse in Meyerson's philosophy. Explanation moves toward bare identity, toward the sphere of Parmenides; reality, ever productive of diversity, is unidirectional, entropic. Thus explanation and reality are essentially divergent. Yet a third factor, the ontological urge in explanation requires that explanation and reality converge, that the real be rational. Three conclusions arise. (1) Meyerson establishes to his own satisfaction the divergent natures of explanation and reality, but supports their convergence wistfully, as a hope only, not having the factual certainty attaching to their divergence. This situation warrants us in pronouncing the consequence of his work positivistic. In spite of his protest against Comtean positivism, his own epistemology issues in the defeat of the epistemological process. (2) His conception of explanation as a single process is over-simplified. Kant's richer teaching indicates that reason moves not merely toward homogeneity, but also toward specification, toward ever sharper discrimination of differences as a consequence of which explanation may arise. (3) His conception of reality is in terms of the familiar abstractions of science. Instead of turning toward immediate experience, he commits what Whitehead calls the fallacy of misplaced concreteness.

But even if we replace Meyerson's metaphysics by one wherein the processes of explanation and of reality follow the same schema, the original paradox will return again, both as an epistemological and as a metaphysical one. The permanent value of his work lies in his clear statement of this predicament which seems incapable of resolution.

What is Wrong with Current Systems of Symbolic Logic? DAVID F. SWENSON.

The question posed can be briefly answered: The *interpretations* on the one hand, by which the symbolism becomes a language for logic, are at crucial points loose and inexact, introducing a misleading terminology and betraying logical confusion; the *rules of operation* on the other hand, by which the algebra is manipulated as an instrument of proof, are such as to encourage an illegitimate ab-

[1] *Mind and the World Order*, p. 20.

straction from essential logical differences, introducing a spurious "generality" into logic. This double confusion in contemporary "exact" logics is more precisely described as follows: relational and non-relational categories are formally equated as if they were commensurable; non-relational functions arising by substitution out of relational ones, and possible or impossible or necessary functions similarly arising by substitution out of one another, are not distinguished as such, but are dealt with as if they were homogeneous with the expressions from which they are derived. The "paradoxical" theorems which emerge as the inevitable consequence of these errors have been dismissed with an inadequate explanation; some logicians have accorded them the respect of recognition as genuine categories of thought. Under this last interpretation, new implication categories are envisaged by the billions, and mysterious profundities have become the order of the day.

The argumentation offered in behalf of the above thesis is too technical and detailed to summarize. The author examines the logical foundations of *Principia Mathematica,* and comes to the conclusion that just as the proposition "p is incompatible with q" is in the second edition illegitimately imported into the system as a reading for the stroke-function (p/q), so the proposition "p implies q" is illegitimately present in the first edition (as well as the second) as a reading for the hook-function $(p \supset q)$. *No form of the implication category is actually expressed in the symbols of this system; the system is thus not a formulation of the laws of inference.* The class calculus on the Boole-Schroeder foundations is in a similar predicament with respect to its problem of formulating class-relations. And the pragmatic interpretation of the phenomena offered by Professor Lewis is shown to have no better foundation than loose thinking and inept terminology.

An Objective Probabilism—A Criticism. HOMER H. DUBS.

This paper criticizes the popular view that science, although it can not attain any certainty, nevertheless achieves probability, taking Dr. E. Nagel's logical theory as an exemplification of that view.

In a scientific spirit he rejects intuition, the *a priori,* and such subjective certainties. Individual probabilities he holds can be determined by empirical frequencies of occurrence; the probability of a theory is the probability of its consequences.

But empirical observation of frequencies only establishes a probability under special circumstances. A long series of observations in which the atomic weight of mercury was measured as constant proved little; today mercury is recognized to have at least four different atomic weights. Certain larger generalizations, such as

Kepler's first law, have abundant exceptions (the perturbations), yet the certainty of the law is thereby unshaken and no probability is thereby established.

Furthermore, if no certainty is attainable, not even probabilities are certain; for then every probability is itself probable, that secondary probability is again only probable, and so on indefinitely. The mathematics of infinite series shows that such a set of probabilities must be summed as zero except under very special circumstances; evidence is offered that these special circumstances are rarely attainable. It follows that, unless certainty can somehow be attained, all probabilities reduce to zero; not even the best established scientific result can claim any logical superiority over the wildest myth.

On the Nature of Reference. PHILIP BLAIR RICE.

Current analyses of knowing as a sign-situation confuse reference and meaning. Meaning is here defined as a complex relation between sign and interpretation, both of which are psychological events. Reference, in the case of a perceptual judgment, involves a transcendence of the psychological order; it is an imputed relation between the interpretation or corrected datum and an independently existing object. The pragmatist treats the object as a "brute existent" which starts off the knowing act and then drops out of the picture; later phases of the act are described entirely in terms of meaning. Ogden and Richards declare reference to be nothing but an inverted causal relation, a backhanded assertion that the object causes the sign and the sign in turn causes the interpretation. For both these views, the "what" of the stimulus-object is unknowable, and the object therefore plays exactly the same rôle in knowledge as did the Kantian thing-in-itself. Critical realism carries the analysis one step farther by saying that reference asserts not only transcendence of the mental content, but also relevance of the mental content to the object. The treatment of relevance in terms of essence, however, is found to be unacceptable. It is suggested that the only escape from this new form of Kantian phenomenalism consists in a rehabilitation of the distinction between primary and secondary properties.

The Spatial Location of Sensa. HORACE S. FRIES.

We shall examine five crucial implications of the hypothesis that sensa have physical, spatial location within the physical body, but external to the immediately perceived body, of the percipient. The examination will reveal that these implications are self-consistent, adequate, and consistent with our body of knowledge. Thus, the

hypothesis furnishes a basis for a method of extensive abstraction; and unless the principle of parsimony is unscientifically rejected, it must be accepted as true. For competing hypotheses, which even pretend to be adequate for the metrical requirements of physics by giving physical, spatial location to sensa, must make the *ad hoc* assumption that there is a projective mechanism within the percipient's organism to project either (1) the immediate awareness of sensa or else (2) the sensa and the immediate awareness. The only alternative is to deny the immediacy of immediately perceived sensa. This denial is the self-contradiction of identity materialism.

The five implications are concerned respectively with the following points: (1) The physiological conditions necessary to allow for immediately perceived "externality." (2) Immediately perceived sizes and distances. (3) The simple measurement of external physical sizes and distances. (4) A distinction (not an opposition) between sensa and other physical brain conditions to account for a brain locality which is "physically" heterogeneous, but which is also the locality of relatively homogeneous sensa. (5) The nature of knowledge in general. Knowledge is primarily a causal process which is referential or mediative; it is only secondarily intuitional.

BOOK REVIEWS

Art as Experience. JOHN DEWEY. New York: Minton, Balch & Company. 1934. viii + 355 pp. $4.00.

The appearance of Professor Dewey's *Art as Experience* is important to two distinct publics in philosophy. For those primarily interested in esthetics it affords a comprehensive analysis of the "common substance" and the "varied substance" of the arts, and the connection of the esthetic with other human interests. It characteristically breaks down the barriers that have both in art and in theory separated art from the rest of experience and fine arts from art in general. For the philosophical public interested in the bearings of Dewey's theory of experience on the varied enterprises and undergoings in life and civilization, this book is of special significance in an understanding of the Deweyan position. It treats art, both on the appreciative and creative side, as a liberation, organization, and integration of experience, and sees in art therefore a "challenge to philosophy."

"In art as an experience, actuality and possibility or ideality, the new and the old, objective material and personal response, the individual and the universal, surface and depth, sense and meaning, are integrated in an experience in which they are all transfigured

from the significance that belongs to them when isolated in reflection. . . . The significance of art as experience is, therefore, incomparable for the adventure of philosophic thought" (p. 297).

The book includes an examination of the characteristic features as well as the common basis of all art, is marked by a rich variety of citation from great artists on their own procedure, and concludes with an examination of the chief current positions in esthetics and their meaning and limitations in the light of "art considered as experience" and in the context of "criticism" and "civilization."

I. E.

Le Concept de Droit selon Aristote et S. Thomas. R. P. Louis Lachance, O.P. Montreal: Albert Levesque. Paris: Du Receuil Sirey. 1933. 453 pp. 50 francs.

The task to which Père Lachance addresses himself is the exposition of the Aristotelian-Thomistic conception of law, but in the accomplishment of that historical task he performs a philosophic service as well: he raises many questions, suggests many distinctions and goes into many side issues of the philosophy of law which might be used profitably for the clarification of contemporary discussions of jurisprudence. The philosopher of law today still finds subjects for discussion in the relation of law to ethics, in the nature of the social sciences and their bearing on law, in the possibility of a science of law and the character such a science should have, but the answers that are suggested in almost every issue of the law reviews of the land show little indication that we have profited by the analyses philosophers have made in the past or that we have learned to avoid the errors they have exposed. Père Lachance presents in detail and in its numerous theoretic and practical ramifications the subtle analysis of law which was made first in the *Ethics* and the *Politics* of Aristotle and which was later developed and systematized in Thomas's commentaries on those works and in the second part of the *Summa Theologica.* The detail of the exposition is from Thomas Aquinas, although the point of departure is usually from Aristotle. Père Lachance is convinced that Thomas not only develops the applications and concatenations suggested by the Aristotelian theory, but also examines the basis of that theory more thoroughly than had Aristotle: in particular Thomas makes explicit (cf. pp. 212 ff.) a fundamental distinction—to be found in Aristotle, to be sure, but little developed by him—between *droit* and *loi* (*jus* and *lex*). Under Thomas's scrutiny that distinction, which was old when the Roman law was codified, is made to yield the formal, efficient, and final causes of law. The exposition is made, consequently, with full

recognition of the difficulties and peculiarities of a science which would deal with the actions of a human agent, whose actions, since he is free, would vary infinitely. It would not be sufficient, however, to point out that in the Aristotelian tradition such sciences are practical, not theoretical sciences, that it would be improper to seek the same precision in all sciences: if there is to be a science of law in a strict sense, it must treat of causes. In the analysis of Thomas Aquinas the science of law must treat of final causes. Book I of Père Lachance's exposition of this science of law takes up the exterior causes of law, first the teleology of law, that is, the relation of law to the common good, then the etiology of law, that is, the relation of law to reason and order. Book II proceeds to the intrinsic causes of law, involving an analysis of the nature of law, justice, and equality; Book III considers the beneficiaries and subjects of law; Book IV finally examines law among the sciences. In the course of these four books, many terms of an older theory—among them natural law, justice, order—which according to the boast of many modern schools have been dropped from the discussion of law, occur as crucial terms of the theory; it is refreshing to see these terms, which have been rejected so frequently in senses which they were never intended to have, employed in an intelligible meaning once more.

R. McK.

The Categories of Charles Peirce. EUGENE FREEMAN. Chicago: The Open Court Publishing Company. 1934. 62 pp. $1.00.

This is a useful though somewhat narrowly conceived conspectus of Peirce's doctrine of categories, and their relation to his theories of logic, pragmatism, tychism, and synechism. Mr. Freeman is chiefly preoccupied with trying to resolve the dilemma of the categories as at the same time universal and objective. He points out that in claiming both properties for his categories Peirce accepted a naïve rationalism not compatible at all points with his empirical outlook. Mr. Freeman also indicates difficulties which arise when meanings conceived as habits are employed to develop a theory of reality, or when a speculative idealism is claimed to be established by means of principles which are simply descriptive of nature. His general conclusion is that while the categories satisfy the conditions of objectivity, Peirce does not and can not demonstrate their universality or their completeness.

Mr. Freeman's monograph is the first of a probably endless series of studies which will approach Peirce as a systematic speculative thinker, an approach fostered by the editors of *Collected Papers.* This is, of course, a neglected side of Peirce. But in my opinion

it would be a mistake and a real loss to philosophy to subordinate the critic and clarifier of ideas to the Peirce who wrote in the grand manner. E. N.

Mécanismes et Conscience. E. AUGIER. Paris: Félix Alcan. 1934. 355 pp. 30 fr.

This is another attempt to construct an "objective" psychology, this time by catching the "elementary" facts of consciousness as they speed by and classifying them. The only difference which this reviewer has been able to discover between the technique of M. Augier and that of classical analytic psychology is that M. Augier believes in the primacy of motor habits, as he calls them. The frequent repetition of certain acts, he believes, will reveal to the observer certain constant elements which become clarified with the recurrence of the act. That is no doubt true, but who is to say that the repetition itself is not the cause of the simplification and clarification? If so, then nothing elementary has been discovered at all. For it is obvious that conscious elements, if they are to be like physical elements, ought to be discoverable in their compounds. But by the very nature of things such a discovery is impossible. This ought to make an investigator conclude that his research is a waste of time. It usually, however, stimulates him to redouble his efforts. G. B.

Social Reformers: Adam Smith to John Dewey. Edited by DONALD O. WAGNER. New York: The Macmillan Company. 1934. viii + 749 pp. $3.25.

This anthology lives up to its ambitious title adequately enough to be acclaimed as a very useful book. Dr. Wagner has selected thirty-three writers, with an eye to their geographical distribution, chronology, similarity of points of view, evolution of doctrine, and adaptability to quotation, assigning an average of about twenty pages to each. As Professor Carlton J. H. Hayes remarks in his Foreword to the volume: "The selected passages are brief enough to be at once arresting and easily readable; and they are long enough . . . to convey at least the flavor of each author's whole philosophy." Brief biographical sketches are supplied, some of which suffer from journalistic efforts to be amusing. A surprising number of the reformers included turn out to have been intellectual prodigies in infancy. It is always possible to quarrel with the choices made, particularly when as "Critics and Interpreters of Modern Society" we find only Tolstoy, Veblen, Tawney, and Dewey. But on the whole Dr. Wagner has done his work of selection (and some translation also) well, thereby placing in his debt a whole host of teachers of elementary social and political philosophy.

H. A. L.

Essentials in the Development of Religion. J. E. TURNER. (Library of Philosophy.) New York: The Macmillan Company. 1934. 308 pp. $4.00.

The book is described in the sub-title as "a philosophic and psychological study" and was written "with the conviction that the psychological analysis of all phases of religious experience, even those which may be accounted the highest, is capable of yielding results of inestimable importance which could be attained in no other way" (p. 13). At the same time, this psychological study does no more than prepare the way for philosophy, and the author acknowledges (p. 19) that his standpoint is predominantly philosophical. In fact, the thought is on such a high level of generality that readers on this side of the Atlantic, deafened by the discordant shoutings of scientific psychologists, had much better put it down simply as philosophy.

Religion is defined as "the response or attitude of humanity, when this response is taken as being an *explicit unity* or real whole, to the Universe, likewise taken as a whole" (p. 32), a definition so wide that it becomes impossible to differentiate religion definitely from the rest of experience or to allow any such thing as irreligion. A similar inclusiveness is found in the author's attitude toward the various modes of experience: "Each of these modes—perception, will, imagination and thought—comes into contact with this world in its own specific way and at a different level, and penetrates its being and nature more or less profoundly according to its peculiar capacity" (p. 79). This inclusive attitude, combined with the generality of treatment and the conciseness necessary for each of the many topics, frequently produces the effect of something quite formal. This feeling, however, is not really justified, for there is a positive content; and the difficulty is rather that the author has to assume acquaintance with conclusions established in his previous works.

Some of the more important positions are the following. The highest development of experience depends in all cases, including religion, on the attainment of ideas that can be progressively systematized into a structure of knowledge. Morality is, in the first instance, action controlled by rational schemes, and ultimately by the principle of "the furtherance of the dynamic development of the Universe" (p. 145), which furnishes an objective criterion of good and evil. Faith, which is inferior to knowledge in certainty, yet rests on knowledge and transcends it both for the sake of action and also to gain more knowledge. God is a Supreme Self, personal at least to the extent of permitting communion with man's spirit; and the universe is friendly in the sense that the finest ideals survive as the dominating factors in all human experience. R. S.

OTHER NEW BOOKS AND JOURNALS

REVUE DE MÉTAPHYSIQUE ET DE MORALE. 41e Année, No. 2. Philosophie de la Nature et Philosophie de l'Intellect: *E. Meyerson.* La méthode et la notion fondamentale de la théorie pure du droit: *H. Kelsen.* Le culte du "moi" et la culture du "moi" chez Frédéric Schlegel: *J. Rouge.* Les constituants de la matière: *L. Leprince-Ringuet.* Documents inédits sur la vie de Spinoza: *A. Rivaud.* Le gouvernement des démocraties modernes: *M. Lazard.*

ANALYSIS. Vol. I, No. 3. Representation and Expression: *C. A. Mace.* A Propos of "Facts": *M. Black.* Variables: A Reply to D. Sholl: *H. W. B. Joseph.* A Suggestion about Value: *W. H. F. Barnes.* The Meaning of Statements: *Alfred Sidgwick.* Having Instances: *Austin E. Duncan-Jones.*

Goodenough, Florence L.: Developmental Psychology. An Introduction to the Study of Human Behavior. (Century Psychology Series.) New York and London: D. Appleton-Century Company. 1934. xvii + 619 pp. $3.00.

Tuttle, Harold Saxe: A Social Basis of Education. (Crowell's Social Science Series.) New York: Thomas Y. Crowell Company. 1934. x + 589 pp. $3.00.

Wright, H. W.: Understanding Human Conduct and Social Relations. Reprinted from the University of Toronto Quarterly, Vol. III, No. 3. April, 1934. Pp. 321–348.

NOTES AND NEWS

Readers will note that in this number the JOURNAL is publishing abstracts of papers read at the meeting of the Western Division of the American Philosophical Association at Indiana University, March 29–31, 1934. Abstracts of papers read at the Association meetings will appear hereafter in place of the reports of the Division meetings and regardless of the subsequent publication of the papers themselves. The JOURNAL regrets that it can not undertake to make abstracts and is therefore limited to publishing only those supplied by the authors themselves. The presidential addresses are not included, since they are published regularly in the PHILOSOPHICAL REVIEW.